

Application No. 10/706,457

REMARKS/ARGUMENTS

The Examiner rejected Claims 1-2, 4-14, and 16-22 under 35 U.S.C. § 103(a) as being unpatentable over Axtell (Patent Number 6,439,697) in view of Lambertson (Patent Number 5,544,103). The Examiner rejected Claims 3 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Axtell in view of Lambertson and, further, in view of Thakoor (Patent Number 4,876,668). Such rejections are noted.

Applicant respectfully submits that Claims 1-22 as amended are allowable for the reasons set forth below.

Obviousness Under 35 U.S.C. § 103

A rejection under 35 U.S.C. § 103(a) must be supported by a *prima facie* case of obviousness. MPEP § 2142. "The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness." MPEP § 2142, pg. 2100-121.

The first element in establishing a *prima facie* case of obviousness is that "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings." MPEP § 2143. The second element is that there must be a reasonable expectation of success. *Id.* The third element is that "the prior art reference (or references when combined) must teach or suggest all the claim limitations." *Id.*; see *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998) (The combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a *prima facie* case of obvious was held improper); see MPEP § 2143.01.

Claims 1 and 13

The Examiner rejected independent Claims 1 and 13 on the basis of Axtell in view of Lambertson. The Examiner correctly states that Axtell does not disclose a programmable memory matrix as claimed in independent Claims 1 and 13. The Examiner then looks to

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Lambert for supplying the element missing from Axtell. The Examiner states: "Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to replace the dynamic memory in the printhead disclosed by Alex et al. [sic] by the floating-gate programmable memory device as disclosed by Lambertson. The motivation for doing so would have been to enable the density of memory cells to be increased as taught by Lambertson (column 1, lines 10-14)." Paper No. 20050217, at 3-4. As discussed below, use of Lambertson's complicated nonvolatile memory would likely increase size requirements as compared to dynamic memory.

Axtell discloses a printhead with "a dynamic memory circuit for storing heater resistor energizing data only for the heater resistor." Axtell, Col. 3, lines 4-5. Axtell states that there is "a need for an integrated circuit ink jet printhead having reduced external interconnections." *Id.*, Col. 2, lines 64-65.

Lambertson discloses programmable nonvolatile memory devices. Lambertson, Col. 1, lines 9-10. Further, Lambertson states that its invention "enables the density of nonvolatile memory cells in such memory devices to be increased [as compared to other non-volatile memory]." *Id.*, Col. 1, lines 11-13.

The second element of *prima facie* case of obviousness is that there must be a reasonable expectation of success for combining the references. MPEP § 2143. Modifying the device of Axtell as suggested by the Examiner to replace the dynamic memory with nonvolatile programmable memory will render the device of Axtell non-functional (or less functional) and defeat the purposes of the Axtell device.

One skilled in the art recognizes that dynamic memory is memory that stores data that is subject to change at any time, possibly very frequently as is the case with the dynamic memory disclosed in Axtell. Additionally, one skilled in the art recognizes that nonvolatile programmable non-volatile memory as disclosed in Lambertson is memory for long term storage of data, including when the device is powered down and not in operation. "The dynamic memory circuit 62 [disclosed in Axtell] is configured to store one bit of heater resistor energizing binary data that sets the resistor drive switch 61 to a desired state (e.g., on or off, or conductive or non-conductive) prior to the occurrence of a fire pulse." Axtell, Col. 6, lines 29-33. By its very nature, this data is subject to change with every fire pulse. Programmable

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nonvolatile memory is not required and serves no purpose in the printhead disclosed in Axtell. Changing the dynamic memory of the Axtell device to a programmable memory requires the addition of additional circuitry and interconnections to enable the read, write (or program), and erase operations. Lambertson, Col. 28, line 48, to Col. 29, line 24.

Because the Axtell device would not operate as disclosed in Axtell with the dynamic memory replaced by the programmable memory as disclosed in Lambertson, the second element of a *prima facie* case of obviousness, that there be a reasonable expectation of success, has not been shown by the Examiner.

The first element in establishing a *prima facie* case of obviousness is that "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings." MPEP § 2143. The Examiner states that the motivation for modifying the Axtell device is provided by the stated purpose of the Lambertson device (reducing the size of nonvolatile memory); however, the purposes disclosed in Lambertson are not similar or related to any need suggested or disclosed in Axtell. The Examiner has failed to explain why the Axtell device should be modified to be combined with the Lambertson device.

The Lambertson nonvolatile programmable memory may be smaller than some other nonvolatile memories, but it is almost certainly much larger than the dynamic memory of Axtell. Any memory design may be made bigger or smaller, but the limit on decreasing memory size are the functions demanded of the memory. A nonvolatile memory must accept and hold a charge for a long time and must be isolated to prevent discharge. In general, larger devices holding larger charges are needed to maintain nonvolatility. In contrast, a dynamic memory such as the one used in Axtell typically holds a charge for a relatively tiny amount of time. Thus, smaller devices are general sufficient to perform this function.

Also, volatile memories require additional circuitry to program and erase them, which increases size as compared to dynamic memory. An EE PROM is usually bigger than an EPROM. (See Col 1, starting line 46 of 5, 544,103 (Lambertson). Applying the same logic, an EPROM is typically larger than dynamic memory.

So, using EEPROM in place of dynamic memory in Axtell would likely make the device larger and slower, and provide a totally useless functionality, namely, nonvolatility.

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The stated objective of the Axtell device is to reduce the number of external interconnections, Axtell, Col. 2, lines 64-65. Lambertson does not disclose, teach, or suggest that the Lambertson device is suitable for reducing the number of external interconnections.

Even if the use of nonvolatile EEPROMS would reduce size (which it will not), Axtell teaches away from reducing size, which would result from increasing the density. Axtell states:

Ink jet printheads made with integrated circuit processes cannot follow the typical integrated circuit cost trend of smaller die and therefore lower cost, since the size of an integrated circuit ink jet printhead is fixed in one dimension by the desired print swath height, and in a second dimension by the desired number of independent fluidic channels and their physical spacing requirements. The increased cost of printheads fabricated with integrated circuit processes of greater complexity cannot be offset by reductions in the size of the printhead without losing printhead functionality such as a loss in printing throughput or a loss in the number of colors on each printhead.

Axtell, Col. 2, lines 52-63.

Because Axtell teaches away from the need to reduce the size of the printhead, which follows from an increase in density, the Examiner's stated motivation is not supported by the references, rather, the Examiner's stated motivation contradicts the references. Accordingly, Applicants respectfully submit that the Examiner has not satisfied the first element of a *prima facie* case of obviousness.

To clarify Claims 1 and 13, they have both been amended to provide that the "programmable memory matrix" is nonvolatile. The concept of programmable memory normally means the memory is nonvolatile, but to make the claims clear, the word nonvolatile has been added. The word "nonvolatile" is not used in the application, but the application describes classic nonvolatile memory that would be immediately recognized as nonvolatile by one of ordinary skill in the art.

New Claims 24 and 25 were also amended to state that the memory matrix is readable by a controller. Nothing in Axtell suggest that the dynamic memory is or should be readable by the controller.

In summary, applicants respectfully submit that the Examiner has not satisfied the first element of a *prima facie* case of obviousness, that there be some motivation to combine. Additionally, the Examiner has not satisfied the second element of a *prima facie* case of obviousness, that there be a reasonable expectation of success. And, even if combined, the

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references do not teach or suggest the amended claims. Accordingly, Applicants respectfully submit that the rejection of Claims 1 and 13 have been overcome. Having no further rejection of or objection to Claims 1 and 13, it is respectfully submitted that Claims 1 and 13 are in condition for allowance. Accordingly, dependent Claims 2-12 and 14-22 are also in condition for allowance as depending from an allowable base claim.

Claims 7, 8, and 19-20

Notwithstanding that the dependent claims are allowable for depending upon an allowable base claim, with respect to the Examiner's rejection of Claims 7, 8, 19, and 20, Applicants respectfully submit that it is inappropriate to rely upon the disclosure of Lambertson to draw any conclusions of obviousness. For the reasons stated above, the functionality of the Axtell device would be destroyed or at least reduced by replacing the dynamic memory devices of Axtell with the nonvolatile programmable memory devices disclosed in Lambertson.

Applicants respectfully submit that the Examiner has not satisfied the second element of a *prima facie* case of obviousness, that there be a reasonable expectation of success. Accordingly, Applicants submit that Claims 7, 8, 19, and 20, are in condition for allowance.

Claims 9-12 and 21-22

Notwithstanding that the dependent claims are allowable for depending upon an allowable base claim, with respect to the Examiner's rejection of Claims 9-12, 21, and 22, Applicants respectfully submit that it is inappropriate to rely upon the disclosure of Lambertson to draw any conclusions of obviousness. Claims 9-12, 21, and 22 include limitations relating to blocking ultraviolet light. Such ultraviolet light is necessary to erase an EPROM. Lambertson, Col. 1, lines 39-41. However, the dynamic memory of the Axtell device requires rewriting of the memory during the normal operation of the printhead. Axtell, Col. 6, lines 29-37; Col. 6, lines 59-63. Accordingly, replacing the dynamic memory devices disclosed in Axtell with EPROMs would prevent the printhead disclosed in Axtell from functioning in a normal manner because, before data can be written to the memory device for controlling a heater resistor, the existing data would have to be erased with ultraviolet light and this would have to occur as the printhead is traveling across the media being printed.

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Applicants respectfully submit that the Examiner has not satisfied the second element of a *prima facie* case of obviousness, that there be a reasonable expectation of success. Accordingly, Applicants submit that Claims 9-12, 21, and 22, are in condition for allowance.

Claims 3 and 15

Notwithstanding that the dependent claims are allowable for depending upon an allowable base claim, with respect to the Examiner's rejection of Claims 3 and 15, Applicants respectfully submit that it is inappropriate to rely upon the disclosure of Lambertson in view of Thakoor to draw any conclusions of obviousness. For the reasons stated above, the functionality of the Axtell device would be destroyed or reduced by replacing the dynamic memory devices of Axtell with the programmable memory devices disclosed in Lambertson.

Also, the Examiner has not shown that the memory devices of Lambertson and the memory devices of Thakoor are the same type of memory devices, or that the memory devices of Lambertson are suitable for modification in accordance with the teachings of Thakoor. It is noted that Lambertson discloses a specific construction of memory devices and that Thakoor discloses a different construction for its memory devices. As required by the second element of a *prima facie* case of obviousness, that there be a reasonable expectation of success, the Examiner has not shown that the different constructions are suitable for combining as suggested by the Examiner.

Applicants respectfully submit that the Examiner has not satisfied the second element of a *prima facie* case of obviousness. Accordingly, Applicants submit that Claims 3 and 15, are in condition for allowance.

Conclusion

In view of the foregoing, it is believed that the above-identified patent application is in a condition for the issuance of a Notice of Allowance. Such action by the Examiner is respectfully requested.

In the event this response is not timely filed, Applicants hereby petition for the appropriate extension of time and request that the fee for the extension, along with any

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other fees which may be due with respect to this paper, be charged to our Deposit Account No. 12-2355.

Respectfully submitted,

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